

1. A device comprising a pump arrangement, at least one venous catheter, and at least one arterial catheter, for establishing and maintaining an artificial circulation in a target area of a human or animal body, said artificial circulation being isolated from the blood circulation of the systemic body, wherein the device further comprises first means for feeding an analysis gas into said artificial circulation, and second means for monitoring whether a blood exchange takes place between said artificial circulation and said systemic circulation.
2. The device according to claim 1, wherein said first means comprise an oxygenator with an analysis gas delivery line into which said analysis gas can be introduced.
3. The device according to claim 1, wherein said second means comprise at least one gas sensor for the analysis gas.
4. The device according to claim 2, wherein said second means comprise at least one gas sensor for the analysis gas.
5. The device according to claim 3, wherein said gas sensor is arranged in a respiratory mask for the air exhaled from the body.
6. The device according to claim 3, wherein said gas sensor is arranged in said artificial circulation.
7. The device according to claim 4, wherein said gas sensor is arranged in an air outlet line of said oxygenator.
8. The device according to claim 7, wherein a further gas sensor is provided which is arranged in an analysis gas delivery line.
9. The device according to claim 3, wherein a control unit is provided which is connected to said at least one gas sensor and to said pump arrangement, for switching off said

artificial circulation in the event of a blood exchange between said artificial circulation and said systemic circulation.

10. The device according to claim 8, wherein said control unit is connected to the further gas sensor.

11. The device according to claim 3, wherein said analysis gas comprises laughing gas ( $\text{N}_2\text{O}$ ), and said at least one gas sensor comprises an  $\text{N}_2\text{O}$  sensor.

12. The device according to claim 8, wherein said analysis gas comprises laughing gas ( $\text{N}_2\text{O}$ ), and said further gas sensor comprises an  $\text{N}_2\text{O}$  sensor.

13. The device according to claim 11, wherein said at least one gas sensor has an  $\text{N}_2\text{O}$  sensitivity of 1 to 1000 ppm.

14. The device according to claim 12, wherein said further gas sensor has an  $\text{N}_2\text{O}$  sensitivity of 1 to 1000 ppm.

15. A device comprising a pump arrangement, at least one venous catheter, and at least one arterial catheter, for establishing and maintaining an artificial circulation in a target area of a human or animal body, said artificial circulation being isolated from the systemic blood circulation of the body, further comprising first means for feeding an analysis gas into said artificial circulation, and second means for monitoring whether said analysis gas passes from said artificial circulation into said systemic circulation, said first means comprising an oxygenator with a gas delivery line into which said analysis gas can be introduced, and said second means comprising a gas sensor arranged in a respiratory mask for the air exhaled from the body.

16. A device comprising a pump arrangement, at least one venous catheter, and at least one arterial catheter, for establishing and maintaining an artificial circulation in a target area of a human or animal body, said artificial circulation being isolated from the systemic blood

circulation of the body, further comprising first means for feeding an analysis gas into said artificial circulation, and second means for monitoring whether said analysis gas passes from said artificial circulation into said systemic circulation, said first means comprising an oxygenator with a gas delivery line into which said analysis gas can be introduced, and said second means comprising a gas sensor arranged in said artificial circulation.

17. A device comprising a pump arrangement, at least one venous catheter, and at least one arterial catheter, for establishing and maintaining an artificial circulation in a target area of a human or animal body, said artificial circulation being isolated from the systemic blood circulation of the body, further comprising first means for feeding an analysis gas into said artificial circulation, and second means for monitoring whether said analysis gas passes from said artificial circulation into said systemic circulation, said first means comprising an oxygenator with a gas delivery line into which said analysis gas can be introduced, and said second means comprising a gas sensor arranged in an air outlet line of said oxygenator.

18. A method in which an artificial circulation is established and maintained in a target area of a human or animal body, which artificial circulation is isolated from the systemic blood circulation of the body, the method comprising feeding an analysis gas into said artificial circulation and monitoring whether a blood exchange takes place between said artificial circulation and said systemic circulation.

19. The method according to claim 18, wherein said analysis gas is conveyed into said artificial circulation via an oxygenator.

20. The method according to claim 18, wherein the content of analysis gas is measured in the air exhaled from the body.

21. The method according to claim 18, wherein the content of analysis gas is measured in said artificial circulation.

22. The method according to claim 19, wherein the content of analysis gas is measured in an air outlet line of said oxygenator.

23. The method according to claim 22, wherein the content of analysis gas is compared with the quantity of analysis gas delivered to said oxygenator.

24. The method according to claim 18, wherein said artificial circulation is switched off in the event of a blood exchange between said artificial circulation and said systemic circulation.

25. The method according to claim 18, wherein laughing gas ( $\text{N}_2\text{O}$ ) is used as analysis gas.

26. A kit comprising an oxygenator, an analysis gas delivery line, at least one venous catheter, and at least one arterial catheter.

27. A method for monitoring whether a blood exchange takes place between an artificial circulation established in a target area of a human or animal body, and the systemic blood circulation of the body, said artificial circulation being isolated from said systemic circulation, comprising the steps of:

- (1) Feeding an analysis gas into said artificial circulation;
- (2) Monitoring whether said analysis gas passes from said artificial circulation into said systemic circulation, and
- (3) concluding of a blood exchange between said artificial circulation and said systemic circulation if said analysis gas passes into said systemic circulation,

wherein step (1) is performed via an oxygenator.

28. The method according to claim 27, wherein step (2) is performed via a gas sensor arranged in the air exhaled from the body.

29. The method according to claim 27, wherein step (2) is performed via a gas sensor arranged in said artificial circulation.

30. The method according to claim 27, wherein step (2) is performed via a gas sensor arranged in an air outlet line of said oxygenator.

31. The device of claim 1, wherein the second means monitors whether the analysis gas passes from the artificial circulation into the systemic circulation.

32. The method of claim 18, wherein monitoring whether a blood exchange takes place comprises monitoring whether the analysis gas passes from the artificial circulation into the systemic circulation.

33. The kit of claim 26, further comprising an analysis gas sensor.